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ABSTRACT

Sixth grade students' attitudes toward school were studied to determine if outdoor education investigations conducted on the school site and in the community would effect a positive change, similar to the change noted with students involved in residential outdoor programs. An experimental group of 28 students participated in outdoor activities one-half day a week for 10 weeks. A control group of 29 students received no special treatment. A pre-test and post-test were administered to the two groups using a 26 item Likert scale developed by the researcher and designed to identify students with a positive attitude toward school. The pre-test mean scores revealed no significant difference between the groups; the post-test means showed the experimental group to have a significantly better attitude toward school (.05 level of confidence). Major implications of the research are that a program of school site and community outdoor education could achieve positive attitudinal changes comparable to those attributed to resident programs and that a classroom teacher with no previous training in outdoor education could successfully implement the program. Appendices include lesson plans for the experimental group's outdoor activities, statistical analysis of test scores, and information concerning test development and validity. (Author/JH)

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THE EFFECTS OF A SCHOOL SITE AND COMMUNITY OUTDOOR EDUCATION PROGRAM ON SELECTED ATTITUDES TOWARD SCHOOL OF SIXTH GRADE STUDENTS

CHARLES SMITH

JANUARY 1979

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THE EFFECTS OF AN ON-SITE AND COMMUNITY OUTDOOR EDUCATION PROGRAM ON SELECTED ATTITUDES TOWARD SCHOOL OF SIXTH GRADE STUDENTS

A RESEARCH REPORT

SUBMITTED BY:

CHARLES A. SMITH

IN PARTIAL FULFILLMENT
OF REQUIREMENTS FOR

MASTER OF SCIENCE IN EDUCATION

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TABLE OF CONTENTS

	PAGE
INTRODUCTION	1
STATEMENT OF THE PROBLEM	4
PURPOSE OF THE STUDY	7
ASSUMPTIONS	8
LIMITATIONS	9
DEFINITION OF TERMS	10
SIGNIFICANCE OF THE STUDY	11
REVIEW OF SELECTED LITERATURE	
1. The connection between attitude toward school and academic achievement	13
2. Procedures used in previous studies	14
3. Studies in outdoor education showing positive attitude gain	15
4. Writings on the topic of school site and community utilization	16
PROCEDURES	
1. The research design	19
2. Designing a pilot instrument	21
3. Conducting the pilot study	23
4. Choosing statements for further study	25
5. Reliability of the instrument	26
6. Validity of the instrument	26
7. Training for the classroom teacher	29
8. The weekly treatment activities	29
9. Conducting the pre-test	30
10. Conducting the post-test	30
THE PRESENTATION AND DISCUSSION OF RESULTS	
1. The presentation of results	31
2. Conclusions to be drawn from the results	32
3. Implications of the results	32
4. Recommendations	33
SUMMARY	34
REFERENCES	36
SELECTED BIBLIOGRAPHY	38

PAGE

APPENDICES

Appendix A:	Listing of tables	39
Appendix B:	The pilot study instrument	49
Appendix C:	Items retained after the rating for content validity by a panel of judges	55
Appendix D:	Program of staff training	56
Appendix E:	The weekly treatments administered to students of the experimental group	57
Appendix F:	The final testing instrument used in pre-test and post-test	89

LISTING OF TABLES

	Page
Table 1 - pilot study statements ranked by t values derived from Edward's formula	39
Table 2 - items from the pilot study retained for further study and content validity rating by a panel of judges	40
Table 3 - student scores on the pilot study instrument reported in a frequency distribution	41
Table 4 - student scores on the pilot study instrument reported by the frequency of each score	42
Table 5 - student scores on the pilot study instrument reported by individual class groups	43
Table 6 - the means, for each pilot study statement, of the top twenty-five percent and the bottom twenty-five percent of students' overall scores	44
Table 7 - the content validity ratings of the panel of judges for each item retained for further study	45
Table 8 - statistical analysis of pre-test scores	46
Table 9 - statistical analysis of post-test scores	47

ABSTRACT

The purpose of this study was to determine if the attitude of grade 6 students toward school would be positively changed after a treatment of outdoor education investigations conducted on the school site and in the community. The treatments, each one-half day in length, were administered to an experimental group of twenty-eight (28) students for a period of twenty weeks. A control group of twenty-nine (29) students received no special treatment. A pre-test and post-test were administered to the two groups using a twenty-six (26) item Likert scale developed by the researcher. The pre-test revealed that there was no significant difference in the mean score of the two groups. The post-test showed that the mean score of the experimental group was significantly higher, at the .05 level, than the mean score of the control group. It was concluded that a significant effect had resulted in the subjects of the experimental group, and was assumed to be due to the weekly outdoor education treatments.

Two major implications of the research were identified. Firstly, a program of school site and community outdoor education could achieve positive attitudinal changes similar to those previously attributed to resident programs and, secondly, this program could be successfully implemented by a classroom teacher with no previous training in outdoor education. It was recommended that school boards introduce their teachers to the outdoor education method and that further study be done in the area of effects produced by on-site and community outdoor education programs.

INTRODUCTION

In the past decade outdoor education has emerged as an integral part of our education process (7:54). As a discernable movement in North America, outdoor education can be traced to the late 1930's in the United States. Throughout the 1940's and into the early 1950's an increasing number of school districts became involved with this "new" approach to learning. Through the 1950's and into the 1960's outdoor education was further popularized in school districts. An example of this emergence is the establishment, in Ontario, of residential sites owned by school boards (15:10).

By the 1970's, the "school camping" movement of the 1940 era had evolved into outdoor education and became a major force utilized at elementary, secondary, collegial and university levels.

Parelleling this development of terms and programs was the availability of resources and opportunities for professional training. By the mid-1950's texts were in print, research was being conducted and institutions were offering both graduate and undergraduate degrees. Today, there are many more texts, an ever increasing body of research and a variety of degree programs available at the bachelor, masters and doctoral levels.

While the name "outdoor education" is relatively recent, the concept of activity centered education is evident in the writings of earlier educational philosophers like John Dewey. Pioneers in the field of outdoor education have indicated the need to enrich traditional classroom teaching. Lloyd B. Sharpe (7:3) felt that the school should be considered as the headquarters from which learning activity is directed, not as the only

place where learning can occur. Julian Smith (7:25) referred to the change from a rural to an urban society that has deprived most youth of close contact with the land and the search for direct learning experiences. Robert Millward (14:5), a more contemporary researcher, reinforces the role of outdoor education as a compliment to traditional learning techniques.

Currently, outdoor education appears to be looked upon as a technique, process or method that brings the student in contact with direct learning experiences. An excellent rationale for this approach was offered by L.B. Sharpe who stated that the person living an experience gains the most from it (7:2).

Within this blanket description there seem to be three more specific views of outdoor education generally accepted. The first, education "for" the outdoors, sees outdoor education as physical skills such as canoeing or skiing. The second, education "about" the outdoors, sees outdoor education through an environmental approach. The third, education "in" the outdoors, sees outdoor education as a compliment to theoretical knowledge and an integrator of subject areas.

Under this latter view, outdoor education activities are chosen to meet specific curricular activities, not as ends in themselves. Programs often start on the school site, utilize the immediate community, progress to regional field trips and culminate in a resident experience away from the school.

It is this writer's belief that this latter approach to outdoor education is particularly applicable to elementary schools and can be utilized with benefit from kindergarten to grade six. Specifically, this research focuses on a program of activities conducted on the school site and in the immediate community. These investigations were used

as treatment in a study to determine the effects of an on-site and community outdoor education program on selected attitudes toward school of sixth grade students.

The initial chapters of this document deal with stating the problem, the purpose of the study, specifying the hypothesis to be tested and defining relevant terms. As well, assumptions made, significance of the project and obvious limitations will also be discussed.

A review of selected literature will present findings pertinent to the study of attitudes in outdoor education, the relationship between student attitudes and academic achievement, and writings on school site and community outdoor education.

A major section of the document will be devoted to the development of a Likert type summated rating scale used to assess the subjects' attitude toward school. The procedures that were followed in conducting the research will also be outlined.

The results obtained from the pre-test and the post-test will be presented and discussed. As well, conclusions will be drawn and recommendations proposed. The document will conclude with a summary, a listing of the sources consulted and appendices containing in-depth information pertinent to the study.

STATEMENT OF THE PROBLEM

Of prime importance to this study is the situation in Quebec, and, more specifically, in the Laurenvale School Board. Although McGill University first offered outdoor education courses to physical education students in 1938, the education faculties of Quebec's teacher training institutions do not currently offer outdoor education options to pre-service teachers. Thus, individuals trained as classroom teachers in Quebec are exposed to outdoor education only through reading, workshops, personal experience or student teaching. An obvious problem that arises is the lack of a consistent interpretation of the philosophies and objectives of outdoor education.

Forced into interpreting outdoor education for themselves, many Quebec schools have initiated resident programs, in some cases organized by teachers with a background in camping. This movement is reinforced by writings that describe resident programs as the apex of outdoor education (6:9). Further reinforcement is provided by research. Despite more than fifty studies on attitudes in outdoor education over the past ten years (8:153-4) not one was uncovered that studied attitudes in a school site context.

Major problems can exist with resident programs, however. To begin with, funds are required for site rentals, transport, food and materials. Also, staff are required to assist the classroom teacher. Finally, without a firm basis in philosophy, and students initiated through school site studies, it is possible that these programs achieve less than their maximum potential.

Faced with these limitations it would appear logical for teachers to capitalize on students' natural interest in the outdoors by utilizing learning resources readily available to most schools. Yet, despite access to open fields, wooded areas and streams, no Laurenvale school has undertaken

an organized program of school site and community investigations. Since 1970,however, every Laurenvale school has undertaken some form of resident program.

This failure to conduct extensive school site and community investigations is not due to a lack of information:

-Hammerman and Hammerman (6:14) in their classic text, "Teaching in the Outdoors," describe an approach to outdoor education that starts with on-site studies and culminates with residency.

-There is also a wide range of written material available on how to conduct on-site programs. The Hammerman text, "A Book of Readings," lists five articles in chapter three alone that deal with studies conducted in the immediate vicinity of the school.

This failure to conduct extensive school site and community investigations is not due to a lack of funds or personnel:

-On-site studies involve minimal equipment that often can be improvised. As well, site rental, transport or food costs do not exist and no additional staff are required, since excursions are led by the classroom teacher.

This failure to conduct extensive school site and community investigations is not due to a lack of knowledge concerning the effects of the outdoor education method:

-The research reported to date, as will be outlined in the review of literature section, indicates that:

a) Outdoor education experiences can positively influence self concept.

b) Outdoor education experiences can positively influence student attitudes toward school and teachers.

Finally, this failure to conduct extensive school site and community investigations is not due to negative local pressure:

-A Laurenvale outdoor education committee, in 1974, identified the school grounds as the logical starting point for outdoor programs.

-Laurenvale administrators express a positive approach to outdoor investigations and have listed this as a priority in individual schools.

Despite the fact that information is available, costs are minimal, positive effects of outdoor education have been shown and the local climate seems ready, schools are still not consistently applying the outdoor education method to school site studies.

It is possible that a major impediment is the lack of a clear connection between the confirmed effects of the outdoor education method, as demonstrated by studies on residencies, and school site and community investigations. With no evidence of proven benefit available, it is possible that teachers are not willing to add a new demand to an already tight daily schedule.

PURPOSE OF THE STUDY

The purpose of this study was to determine specific attitudinal effects that resulted in grade six children following a program of school site and community outdoor education investigations.

The specific hypothesis to be tested was: "Following a treatment of school site and community outdoor education investigations, the experimental group will display a more positive attitude toward school, significant at the .05 level, than the control group."

ASSUMPTIONS

In conducting this investigation the following assumptions have been made:-

1. That attitudes can be studied and the means exist to assess them.
2. That attitudes can be altered by exposure to specifically constructed environments.
3. That it is desirable to positively change a student's attitude toward school.
4. That this study is not in direct conflict with values the subjects will encounter at home.
5. That the classroom teacher of the experimental group, with a background in teacher training supplemented by specific outdoor education training conducted by the researcher, is capable of carrying out the treatment phase of the project.
6. That the philosophies and goals of outdoor education are compatible with the philosophies and goals of The Laurenvale School Board.

LIMITATIONS OF THE STUDY

Despite efforts to eliminate influential factors which might effect the results of the study, the following limitations must be recognized.

1. It is not possible to fully control the conditions that operate within control and experimental groups. In particular, the variety of human variables that exist within individual teachers, and the conditions existing within individual schools cannot be fully controlled.

   It is assumed, however, that these factors not within the researcher's complete control are equally distributed between the parties involved in the study.

2. Should there be a positive attitude change on the part of the subjects, no inference will be made concerning the permanence of this change.

3. Due to the size of the sample and the length of the treatment, the findings of this investigation will be generalized only to similar classes within the Laurenvale School Board.

DEFINITION OF TERMS

Attitude Toward School: the degree of positive or negative feeling an individual expresses toward school based on the interpretation of scores from "An Instrument to Survey Student Attitudes Toward School", as measured at the time of administration of the testing instrument.

Outdoor Education: a multidisciplinary method of teaching that aims at the enrichment of the existing school curriculum by using the out of doors or objects found there to generate first hand learning experiences.

School Site Investigations: outdoor education experiences conducted in the school building or on the school grounds.

Community Investigations: outdoor education experiences that utilize human or physical resources in the community within walking distance of the school.

Resident Outdoor Education: a continuous living experience of at least a one night stay removed from the school, at a site offering out of door resources not available at the school.

SIGNIFICANCE OF THE STUDY

This study is not the first to investigate student attitudes and how they might be affected by a treatment of outdoor education activities. There are, however, a number of ways in which the present research is more than a replication of previous studies. The writer views the following points as highly significant:

1. The focus of this research is school site and community outdoor education programs, a topic not commonly investigated.

2. The treatment utilized in this research was administered by a classroom teacher who has had no formal training in outdoor education.

3. The outdoor education method utilized in the treatment can be adapted to elementary schools with a wide variety of outdoor resources.

The first point refers to the preoccupation of past research with resident outdoor education settings. While these programs have their value, the expense and the need for additional staff stand as potential obstacles. As well, since the social situation is one that takes the students away from their home for a period of time, there can be no question that the resident program is more applicable to older elementary children, possibly grades four through six. A major significance of this present research, then, is to focus attention on a program that can: 1) be implemented without additional cost or staff 2) use facilities that are readily accessible 3) prepare students to fully appreciate and participate in residencies. Furthermore, the methods used in the treatment can be adapted to any elementary grade level from kindergarten to grade six.

With a great deal of time being spent on a curriculum enrichment approach to outdoor education in texts, credit courses and workshops, it would seem worthwhile to investigate potential benefits that result. It is hoped that this research will give impetus to further investigations in that direction.

A second point of significance is that the treatment administered to the experimental group was conducted by a classroom teacher who had no formal training in outdoor education. Through discussions with the researcher and the reading of pertinent articles selected by the researcher, the classroom teacher was introduced to the philosophies and techniques of outdoor education. In conducting the weekly treatment, the classroom teacher followed a lesson plan prepared by the researcher.

A most significant aspect of this exercise is that classroom teachers at the elementary level can be trained to conduct outdoor education programs. The time in which to undertake this training usually exists as in-service days and the expertise is available through consultative staffs or teacher training institutions.

A final point of significance is that the methods used in implementing this research can be applied to elementary schools with a wide variety of outdoor resources. While the experimental group school had access to fields, wooded areas and streams, the majority of their objectives could be met in an urban environment making use of paved areas, snow, local businesses and available vegetation. The locale might change, but the technique of relating what is learned in the classroom to the real world just outside the classroom doors does not. Excellent information on this technique is contained in the Phyllis Busch and Helen Ross Russell texts that are listed in the bibliography.

REVIEW OF SELECTED LITERATURE

The intent of this section is to establish a connection between the current investigation and past studies. While no studies dealing directly with attitudinal change in a school site and community setting have been found, a number of studies pertaining to attitudinal change in the resident setting were reviewed. The conclusions of these latter investigations will be presented, as well as writings on the use of the school site, and the connection between attitude toward school and academic achievement.

The review of literature is organized in the following manner:

1. The connection between attitude toward school and academic achievement.
2. Procedures used in previous studies.
3. Studies in outdoor education showing positive attitude gain:
    a. attitude toward school
    b. other areas
4. Writings on the topic of school site and community utilization.

1. The connection between attitude toward school and academic achievement.

A general connection between the attitude of students toward school and their academic achievement appears to be a topic of some controversy.

Marjoribanks (12:653) cites eight studies that show a significant relationship between these variables. At the same time, however, he cites four other studies showing no significant relationship, and judges previous research on the subject to be inconsistent and inconclusive. His assessment is that most of this research fails to consider the cognitive abilities of children.

In his own research Marjoribanks did consider the differing levels of cognitive ability. His findings were (12:658), that at each level of ability, an increase in the student's attitude toward school was related to an increase in achievement.

Simonson considers the relationship between attitude and achievement in a more specific context, that of the student's attitude toward the content of a specific course. Citing seven studies that show a significant relationship between these variables, Simonson concludes that attitude toward course content has been identified as an indicator of student achievement in that course (19:163).

In this present study student attitude and achievement will not be correlated, thus a firm consensus on the relationship is not required. There would, however, appear to be adequate evidence in favour of positively changing student attitudes toward school. Simonson supports this view, stating that student attitude should be an important goal for the teacher (19:167). He further states that the affective growth of students is as important as academic achievement and that educational researchers should provide teachers with techniques for improving both (19:168). As stated earlier, the intent of this research was to investigate one vehicle for affecting this positive change.

2. Procedures used in previous studies

The methods and procedures utilized in this research are consistent with previous studies and have been shown to be appropriate. The Likert type summated rating scale was used by Simonson to assess student attitudes as well as in the ESTES scales (16:292). Also, Blair and Kershner (1:9) use the Likert approach because of its ability to yield reliable results.

The procedure of constructing an instrument with statements gathered from students is used in previous research (Marjoribanks), as are the methods used to determine reliability and validity.

Split-half reliability, corrected by the Spearman-Brown formula, has been judged appropriate in determining internal consistency (16:193) (1:11), while a rating of individual items by educational specialists has been used to establish content validity (1:5).

3. Studies in outdoor education showing positive attitude gain

a. Attitude toward school

The review of literature revealed that approximately fifty studies in the past ten years have addressed the topic of student attitudes as influenced by outdoor education. It is estimated that seventy percent of these studies indicate a positive attitude change by the students (8:153).

A topic specifically studied by a number of these investigations was the students' attitude toward school.

Stack (1964) indicated that, after a program of resident outdoor education, children showed a positive attitude change toward their teachers and school. Millward (1975) found that a one week residency resulted in a positive attitude change toward teachers and education. Coons (1973), using a two week residency for early adolescents, found that a significant positive change resulted in students toward learning and the value of the teacher in learning.

b. Other areas

The previous research indicates positive attitudinal gains in other areas as well.

The Coons and Stack research found that students underwent a positive change in self-concept. Baker (1959), studying self concept and social relationships in a resident setting, found that the experimental group underwent a greater positive change than the control group (7:138). Davidson (1965), studying sixth graders in a one week residency, concluded that there was a positive change in self concept and social relationships. Sharp (1947) found that children, after a resident program, listed a greater number of topics on an interest inventory. Fletcher (21:36) found that students,

after a resident program, were better at cooperating with one another and showed greater self-confidence.

With the recent surge of concern for the environment, research has been conducted that is pertinent to this study. Jensen (21:56) found that attitudes about the natural environment could be positively changed through emphasis on outdoor related programs. Howie (21:49) tested the cognitive learning of environmental education material by fifth grade children. His findings indicated that a balanced program of class activities followed by outdoor experiences was more effective than a program of class activities alone.

While it seems clear that outdoor education can be a positive factor in the affective development of children, this continual focus on resident settings must be questioned. The resident program, since it requires a specialized site, additional funds and support staff, is not readily accessible to all schools. The findings of this previous research then, although providing a basis from which to proceed, appear lacking in that they do not offer teachers at all levels or schools a means of positively affecting students attitudes.

4. Writings on the topic of school site and community utilization

Although the author has not found any research that investigates the attitudinal effects of school site and community programs, writers in outdoor education have identified possible benefits of such programs.

Carlson (7:122) in an article entitled "Enriching the School Curriculum by Using the Immediate Environment" wrote that first hand experiences can enrich the existing curriculum. Sharp (7:2) reinforces this philosophy by writing that it is always the person experiencing a situation who gets the most from it. Brainerd, in an article entitled "Schoolgrounds for Teaching Man's Relationship to Nature" called for better use of the school site to teach

mathematics, science and environmental education (7:136). Weaver wrote about the same type of program in contending that most communities are rich storehouses of resources available to the elementary school science teacher (7:141).

If, as previous research indicates, the outdoor education method can be a factor in a child's affective development, and, since there are writings on how to conduct programs in the neighbourhood of the school, it would seem logical to mesh the two. There would seem to be more than enough evidence to warrant this study which attempted to bridge the gap between previous research and the need to provide all teachers with a means to positively influence their students' affective growth.

The preceeding section has undertaken to demonstrate the connection of this study to previous research. First considered was the connection between student attitude toward school and academic achievement. Although the evidence is not conclusive, there is clearly enough to indicate the desirability of positively affecting student attitudes.

A selection of studies dealing with attitude change and outdoor education were then presented. There was evidence that outdoor education programs, albeit in a residential format, can be effective in positively influencing student attitudes toward self, teachers and school.

Finally, the writings of selected outdoor educators on the subject of school site and community utilization were presented. It was stated that this investigation studied the effect on students' attitude toward school of a school site and community program.

PROCEDURES

The purpose of this chapter is to describe in detail the procedures followed in conducting this research. The material is organized in the following manner:

1. The research design.
2. Designing a pilot instrument.
3. Conducting the pilot study.
4. Choosing statements for further study.
5. Reliability of the pilot study instrument.
6. Validity of the instrument.
7. Training for the classroom teacher.
8. The weekly treatment activities.
9. Conducting the pre-test.
10. Conducting the post-test.

1. THE RESEARCH DESIGN

a. The subjects:

The subjects of this research were grade six children of the Laurenvale School Board. Specifically, the experimental group was a class unit of twenty-eight children from a middle class residential community made up predominantly of single family dwellings. The control group was a class unit of twenty-nine children from a middle class residential community, smaller in size than the other community and more rural. In both cases the vast majority of children are Anglophone.

The choice of these particular class units was based on the following criteria:

- the willingness of the class teacher to participate
- the absence of other programs aimed at the students' affective development
- the absence of pilot projects in specific subjects
- the homogeneity of the class unit. ie: no bridge groups

b. The treatment:

The experimental group subjects were exposed to a treatment of outdoor education experiences conducted on the school site and in the community adjacent to the school. Each week during this twenty week period the teacher devoted one afternoon to a curricular topic using the method of outdoor education. These topics, and the activities selected to achieve the desired objectives, were selected by the researcher in consultation with the class teacher. The total time devoted to the treatment was approximately forty hours.

b. The treatment: (cont'd)

Implementing the weekly treatments involved dividing the activity into three segments, each consuming roughly one third of the scheduled time. These segments were the following:

- the pre-teaching of theoretical knowledge or background information
- the outdoor excursion
- follow-up activities

The control group was exposed to no special treatment other than the regular course of studies.

c. The design:

This research utilized a pre-test, post-test design with a control group and an experimental group. The experimental group underwent a program of treatments while the control group was exposed to no special treatment. The pre-testing of subjects was conducted in December 1977 and the post-testing was conducted in May 1978.

d. The collection and statistical treatment of data:

The data gathered from the subjects was their attitude toward school as determined by scores on a summated rating scale. The scale used was a Likert type instrument constructed specifically for this research. Details of the construction will be presented later in this chapter.

The data was treated to determine if a significant positive change had occured in the subjects attitude toward school from pre-test to post-test. The mean scores of experimental and control groups from the post-test were used in a formula for independant groups to determine if change was significant at the .05 level (10:88). The following formula was used:

$$t = \frac{M_1 - M_2}{\sqrt{\left(\frac{\Sigma x_1 + \Sigma y_2}{N_1 + N_2 - 2}\right)\left(\frac{N_1 + N_2}{N_1 N_2}\right)}}$$

d. The collection and statistical treatment of data: (cont'd)

For the purpose of testing, the hypothesis was written in the null form:

"Following a treatment of school site and community outdoor education experiences, the experimental group will not display a significantly more positive attitude toward school than the control group."

e. The data gathering instrument:

To gather data from the subjects, a Likert type summated rating scale was constructed. To insure its relevance this scale was developed from statements gathered from children and tested in a pilot study. It was hoped that the pilot study would yield an adequate number of statements capable of discriminating between students with a positive attitude toward school and students with a less positive attitude toward school.

2. DESIGNING A PILOT INSTRUMENT

a. Generating statements from children:

To generate data from which pilot statements could be selected four grade six classes of the Laurenvale School Board were randomly selected and visited. A total of 104 students, 58 boys and 46 girls, contributed information.

The children were asked to write one thing that was good about school and one thing that was not good. It was stressed that only the researcher would see the responses and the children were asked not to write their names. The students were also encouraged to express their true feeling, not what they felt others would expect them to express.

b. Classification of the statements:

From the 104 students a total of 183 statements were collected, 106 positive and 77 negative. Once duplications were eliminated 97 separate statements remained and were classified into the following categories:

b. Classification of the statements: (cont'd)

- the school curriculum
- judgements on the worth of school
- opinions on teachers
- opinions on learning
- friends at school
- treatment while at school
- school work
- miscellaneous

The following chart will outline the distribution of statements by category:

Category	Positive Statements	Negative Statements	Total Statements	Different Statements
Curriculum	46	13	59	17
teachers	13	10	23	9
judgement	6	13	19	18
friends	13	6	19	9
learning	17	-	17	11
work	3	14	17	6
treatment	-	15	15	9
miscellaneous	8	6	14	11
TOTALS	106	77	183	97

c. Choice of statements for the pilot instrument:

In making the selection of statements for the pilot instrument two criteria were used:

1. The pilot instrument attempted to reflect the distribution, by category, of the original statements.
2. Each statement chosen should relate to the personal experience of a large percent of the students.

The result of this exercise was the selection of fifty pilot statements, distributed by category as follows:

- curriculum 4 statements
- teachers 10 "

d. Choice of statements for the pilot instrument: (cont'd)

- judgement	10 statements
- friends	6 "
- learning	8 "
- work	6 "
- treatment	6 "
- miscellaneous	0 "

One final check was made on the fifty statements. Each was scrutinized to determine if it was asking the student to respond to a fact. Such a statement would force a response of "yes" or "no", whereas the researcher's interest was the attitudes of the subjects expressed along a positive-negative continuum.

It is to be noted that the distribution of statements by category on the pilot instrument did not correspond exactly to the distribution by category of the students' original statements.

The curriculum category, for example, contained the highest number of original statements. The vast majority of these statements, however, were directed to a specific subject. In applying the second criteria for selection, that statements relate to the personal experience of most students, it was felt that a limited number of the curriculum statements were general enough to be satisfactory.

The statement categories relating to teachers and judgement were most heavily represented on the pilot instrument. While these categories were not as high as curriculum in the total statements column, it was felt that the statements were more likely to relate to the experience of virtually every child.

3. CONDUCTING THE PILOT STUDY

a. Administering the instrument:

The completed pilot document "an instrument to survey student attitudes toward school" was administered to 126 children in June 1977. The students, all grade 5 or grade 6 levels, were

a. Administering the instrument: (cont'd)

from three different schools of the Laurenvale School Board.

The administration of the instrument was conducted by the researcher to individual class units ranging in size from eighteen to twenty-five students. In all cases the class teacher was asked to leave the room during the administration of the pilot instrument.

The students were instructed not to write their name on the document. Each booklet had previously been numbered and, as the booklets were distributed, the student's name was recorded on a list opposite the appropriate number.

b. Treatment of the pilot study data:

The completed booklets were scored by class unit, using a scale of one to five points on each item. One point was awarded to the least positive response on an item, while five points were awarded to the most positive response on an item. It was discovered that one student had missed two entire pages (20 items) of the booklet. In all statistical treatments, therefore, the sample will appear as N = 125. The results of the scoring can be found in Table 4, frequency by score.

A frequency distribution was then drawn up for the entire sample and the mean, mode, median, range and standard deviation were computed. The same procedure was then followed for each class unit. The results of these exercises can be found in Table 3, frequency distribution of the pilot study, and Table 5, scores by class unit.

c. Item analysis of the pilot instrument:

The final step in the statistical treatment was an item analysis conducted on the top 25% and the bottom 25% of the overall scores. The purpose of this analysis was to identify those statements that best distinguish between students with a positive attitude and students with a less positive attitude toward school.

c. Item analysis of the pilot instrument: (cont'd)

Once the top and bottom 25% of scores were identified (N = 32 in each case) a chart was drawn up showing the mean response of these two groups to each of the fifty statements. This chart can be found in Table 6. These means were then used in the formula (3:153)

$$t = \frac{XH - XL}{\sqrt{\frac{(X_H - X_H)^2 - (X_L - X_L)^2}{n(n-1)}}}$$

The resultant t values were interpreted as the ability of that statement to distinguish between students with a positive attitude and students with a less positive attitude toward school. The chart in table 1 ranks the fifty pilot statements, in positive and negative groupings, by t value.

4. CHOOSING STATEMENTS FOR FURTHER STUDY

Using Edward's (3:153) criterion of t = 1.75 as an acceptable discriminating factor, fifteen positive and fifteen negative statements were chosen for further study.

It is to be noted that the statements with the highest t values in positive and negative categories were not necessarily chosen. Among the positive statements, items two and four were judged to be virtually the same. Item two, with a higher t value, was chosen. In the same manner, positive item eight was chosen over positive item fifteen.

Among the negative statements, items five and eleven were judged to be extremely close and item five was chosen.

Positive items sixteen and seventeen, as well as negative item sixteen, were then added bringing the total to thirty statements. A breakdown of these statements by the categories originally established is as follows:-

Category	Positive	Negative	Total
curriculum	1	1	2
teachers	4	4	8
judgement	5	5	10
friends	-	2	2
learning	3	1	4
work	1	2	3
treatment	1	-	1
	15	15	30

A listing of the statements retained for further study can be found in table 2.

5. RELIABILITY OF THE PILOT INSTRUMENT

A reliability figure for the pilot instrument was established using the split-half technique (18:160). In this method the scores on odd-numbered items are correlated with the scores on even-numbered items to produce a coefficient indicating the internal consistency of the testing instrument.

Using the scores obtained by the 125 subjects a coefficient of .91 was computed (18:64). This figure was then corrected by applying the Spearman-Brown formula (18:163) to compensate for the smaller number of items used in correlating one half of the test with the other half. The final figure for internal consistency thus obtained was $r = .95$

6. VALIDITY OF THE INSTRUMENT

a. Description of validity:

In addition to demonstrating that the instrument is consistent in its performance, the researcher must establish a link to reality. The concept of validity, then, or the ability of the instrument to address itself to a stated topic, was considered next.

a. Description of validity: (cont'd)

The validation of the instrument, as is common in the behavioral sciences, must be indirect rather than direct. In this study it was intended to establish a degree of face and content validity.

The first form of validity (face) is established by scrutinizing the items to see if they "appear" to measure that which they purport to measure. After careful examination it was the researcher's judgement that the items do maintain an acceptable degree of face validity.

The second type of validity (content) to be established is the more crucial in that it was considered to be a sine qua non requirement of this research. By content validity is meant the ability of the instrument to sample a particular universe, in this case the makeup of a student's attitude toward school It was intended to establish an acceptable degree of content validity in two ways. The first was a comparison of the universe of "attitude toward school" to previous research and the second was assessment by a panel of judges.

b. Establishing a universe:

For the purposes of this research the universe of a student's attitude toward school consisted of his feelings toward teachers, school work, learning, friends, school rules, curriculum, and the value of school. In reading other work done in this area it was obvious that this universe was consistent with factors identified by other authors. McClusky used a twenty-eight item Likert scale that covered the areas of teachers, subject matter and friends. In both cases the "teachers" category was the largest.

Perney, in constructing the Student Opinion Inventory, used categories of teachers, treatment of students, curriculum and school in general.

b. Establishing a universe: (cont'd)

Flanders sub-divided student attitudes into teacher attractiveness, fairness of rewards and punishments, teacher competence and interest in school work.

Based on these comparisons the writer was confident that the universe "attitude toward school" was adequately established. The next step was to establish the appropriateness of the items in sampling this universe.

c. The use of a panel of judges:

To perform this task five judges were engaged to rate each item. They were:

- a supervisor of student services with an elementary school board
- a guidance counsellor with an elementary school board
- a Director of Instructional Services with an elementary school board
- two professors of tests and measurements at an institution of higher learning

Each of the judges was given a description of the universe to be sampled and a listing of the thirty statements. A blank sheet was attached for further optional comment. The instructions called for a ranking of each item on the following scale:

4 - very appropriate
3 - appropriate
2 - somewhat appropriate
1 - not appropriate

The results of the judges' ratings were averaged to yield a score for each item. It had previously been established that an average score of 2.5 out of 4 would be the minimum acceptable score. A summary of the judges' ratings can be found in Table 7.

c. The use of a panel of judges: (cont'd)

Although all items achieved this minimum score it was felt that several items were identified by the judges as being somewhat weaker than others. Twenty-six statements out of the thirty were retained to form the final testing instrument. They may be found in Appendix C.

Based on the judgement of face validity, the conformity of the universe with past research and the assessment of the panel of judges, it is felt that an acceptable level of validity has been established.

7. TRAINING FOR THE CLASSROOM TEACHER

To provide the classroom teacher with some understanding of outdoor education, a program of staff training was implemented. The objective of this training was to acquaint the teacher with the philosophy of outdoor education, key figures and texts in the field and relate these to this investigation. Of particular concern was the extent to which outdoor education could enrich the existing curriculum in a multidisciplinary manner.

A further outline of the staff training program can be found in Appendix D.

8. THE WEEKLY TREATMENT ACTIVITIES

The treatment phase of this research was described earlier in the paper. Each of the weekly activities was designed to meet a curricular objective chosen by the investigator. The curriculum areas involved were science, social studies and language arts. Since outdoor education is multidisciplinary in its approach, many of the activities may touch two or even all three of the curriculum areas. Nevertheless, one objective was stated as primary for each activity.

A detailed outline of the activities can be found in Appendix E.

9. CONDUCTING THE PRE-TEST

The pre-test was administered to both control and experimental groups in December 1977. As with the pilot study the classroom teacher was not present for the testing. As well, booklets were again numbered so that children did not write their names on the instrument.

The pre-test booklets were scored and a mean computed for control group and experimental group. These means were then used in the formula for independant groups(10:88) to determine if a significant difference existed between the groups. Based on pre-test scores it was determined that the control and experimental groups were not significantly different in regard to attitude toward school.

A statistical analysis of pre-test scores can be found in table 8.

10. CONDUCTING THE POST-TEST

Following the treatment phase of the research, a post-test was administered to the experimental and control groups in May 1978. Procedures used in the pre-test were once again followed and the students received a booklet marked with their pre-test number.

A statistical analysis of post-test scores can be found in table 9.

THE PRESENTATION AND DISCUSSION OF RESULTS

The purpose of this chapter is to present and discuss the results of the research. Specifically, the information will be organized in the following manner:

1. The presentation of results
2. Conclusions to be drawn from the results
3. Implications of the results
4. Recommendations

1. The Presentation of Results

As outlined in the procedures chapter, the research design utilized in this project required testing the subjects before and after the administration of the treatment. The pre-testing, conducted in December 1977, indicated that there was no significant difference in the attitude toward school of the experimental and control groups. At that time the mean score of the control group was 81.92, while the mean score of the experimental group was 83.92. Further statistical information on the pre-test can be found in Appendix E.

Following the administration of weekly outdoor education treatments to the experimental group, a post-test was conducted using the same testing instrument. This post-test, conducted in May 1978, revealed that the experimental group mean had risen to 89, while the control group mean had fallen to 75.57. These two means were then used in a formula (10:88) to determine the significance of the difference between the means of independant groups. The t value derived from this formula was 2.69.

Reference was then made to the t table (10:151) where, at forty-two degrees of freedom, it was found that .05 = 2.002 and .01 = 2.70. The t value obtained from this research (2.69) was thus greater than the .05 level of probability (2.002) and only slightly less than the .01 level of probability (2.70).

It can therefore be concluded that, following the treatment, there was a significant difference between the means of the control and experimental

groups based on the testing instrument. Further evidence of this difference can be seen in the percentage of students in each group who increased their score from pre-test to post-test. In the control group 26% of students (6/23) scored higher on the post-test, while, in the experimental group 76% of students (16/21) scored higher.

2. Conclusions to be Drawn From the Results

From the results presented in the preceeding section it can be concluded that a significant effect on the experimental group subjects has resulted, and is assumed to be due to the weekly outdoor education treatments. Thus, the null hypothesis is rejected, and the hypothesis that speculated a significantly positive attitude change in the subjects is accepted.

3. Implications of the Results

There would appear to be two major implications of this research:

1. That a program of on-site and community outdoor education can result in positive attitudinal changes similar to those previously attributed to residency programs (7:153).

2. That an outdoor education program of on-site and community activities can be implemented by a teacher with no previous training in outdoor education.

The first implication is particularly relevant to the elementary school teacher who wishes to use the outdoor education method. Earlier in this document resident experiences were described as expensive, requiring additional staff and applicable mainly at the upper elementary level. The advantages of the programs utilized in this research are that they require no additional funds, staffing or facilities, and are applicable to all elementary levels from kindergarten to grade 6. Thus, the benefits of outdoor education that writers often refer to might be available to all grade levels, within walking distance of the school.

The connection between student attitude and achievement was discussed earlier in this document. There would seem to be evidence that the two are connected (12:653) and, that the affective development of students is a worthy goal for teachers (19:167). A possible benefit of

this research, then, is the identification of a means by which elementary school teachers can work towards the affective growth of students.

The second implication refers to the participation, in this research project, of a teacher whose only background in outdoor education was the time spent with the project. This training involved reading and discussion prior to the treatment and lesson plans provided by the researcher during the treatment. For those involved with organizing or promoting outdoor education at the elementary school level, then, this research offers encouragement and reinforcement.

To conclude, it is not being suggested that all traditional classroom teaching be replaced by the outdoor education method. It is assumed that students do benefit from this informal, more self-directed approach to teaching. It is further assumed that the factors of student-teacher relationships, student-student relationships, student outlook on learning and other aspects of the universe "attitude toward school" can be positively developed in the outdoors through an investigative, activity oriented method.

4. Recommendations

Based on the experience gained in conceiving and implementing this research, as well as the significant result achieved, the following recommendations are offered:

1. That on-site and community outdoor education continue to be used as a method of teaching in the Laurenvale elementary system and be further expanded.

2. That further study be done in the area of effects produced by on-site and community outdoor education programs. Considerations for more elaborate research might include a larger sample, a longer period of treatment or a revised data gathering instrument.

3. That elementary school boards introduce their teachers to the outdoor education method through workshops and the engagement of consultative services.

SUMMARY

The preceeding pages of this document have described a research project designed to determine the effects of an outdoor education program on the attitude toward school of sixth grade children. Outdoor education was described as a method of teaching that seems to have three major interpretations, an activity, environmental and a curriculum enrichment interpretation. The latter view, seen by the author as particularly applicable to elementary schools, begins on the school site, makes use of community or regional resources and culminates in a resident experience. All the research on outdoor education reviewed concerned these resident programs, yet the on-site and community programs can exist at any grade level without additional funds or staffing. The purpose of this study was to determine if these locally oriented programs would have a positive effect on the attitude toward school of sixth grade children.

A review of selected literature established the connection of this study with past research. It was shown that the Likert type rating scale, the research design, the use of a split-half reliability figure and the universe of "attitude toward school" are consistent with previous studies. Furthermore, it was established that there is a basis for the contention that positive attitudes and achievement are related. Finally, writings were presented to support the importance of developing a student's affective behaviour.

Writings in outdoor education were then reviewed. These studies indicate that positive change can be achieved in a resident setting. While no studies were uncovered dealing with attitude change in an on-site or community context, a selection of articles was reviewed that encouraged teachers to utilize the natural resources immediately available to them.

A major chapter of the document dealt with the construction of a summated rating scale from statements generated by students. The gathering of these statements, their use in a pilot study, the item analysis conducted on the statements and the selection of the final statements

was outlined. Finally, the procedures used in establishing satisfactory degrees of reliability and validity were described.

The results of the research were presented and the implications discussed. It was found that the control and experimental groups, with no significant difference between at the outset, were significantly different when tested on their attitude toward school following treatment. This significance easily surpassed the .05 level of confidence.

The conclusion was drawn that the treatment did have a significantly positive effect on the subjects. As well, two major implications were identified: 1) the on-site programs seem to produce positive changes similar to those reported in the more expensive resident programs, and 2) the treatment was administered by a classroom teacher not previously exposed to outdoor education training.

Based on the results it was recommended that on-site and community outdoor education programs in the Laurenvale School Board be continued and expanded, that other school systems consider introducing their teachers to the outdoor education method and that further investigations be conducted on the effects of on-site and community outdoor education programs.

The concluding sections of this document contain further information germain to the project. A listing of the specific references consulted, additional sources for further study, statistical data, the testing instruments and detailed information crucial to the implementation of this proposal are presented.

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APPENDIX A

Table 1 - Pilot study statements ranked by t values derived from Edward's formula.

Table 2 - Items from the pilot study retained for further study and content validity rating by a panel of judges.

Table 3 - Student scores on the pilot study instrument reported in a frequency distribution.

Table 4 - Student scores on the pilot study instrument reported by the frequency of each score.

Table 5 - Student scores on the pilot study instrument reported by individual class groups.

Table 6 - The means, for each pilot study statement, of the top twenty-five percent and the bottom twenty-five percent of student's overall scores.

Table 7 - The content validity ratings of the panel of judges for each item retained for further study.

Table 8 - Statistical analysis of pre-test scores.

Table 9 - Statistical analysis of post-test scores.

TABLE 1

PILOT STUDY STATEMENTS RANKED BY t VALUES DERIVED FROM EDWARD'S FORMULA

POSITIVE ITEMS				NEGATIVE ITEMS			
PILOT NO.		RANK	t-VALUE[x]	PILOT NO.		RANK	t-VALUE
36.	*	1	7.70	26.	*	1	8.17
48.	*	2	6.68	46.	*	2	8.14
37.	*	3	6.56	22.	*	3	7.39
7.		4	6.47	2.	*	4	5.83
8.	*	5	6.05	12.	*	5	5.66
17.	*	6	5.40	42.	*	6	5.65
1.	*	7	5.16	49.	*	7	5.56
40.	*	8	5.10	15.	*	8	5.49
28.	*	9	4.97	29.	*	9	5.47
19.	*	10	4.45	38.	*	10	5.35
31.	*	11	4.44	47.		11	5.29
33.	*	12	4.23	44.	*	12	5.22
27.	*	13	4.16	32.	*	13	5.07
39.	*	14	4.02	4.	*	14	5.05
5.		15	3.70	34.	*	15	4.96
50.	*	16	3.61	10.	*	16	4.84
16.	*	17	3.06	30.		17	4.56
20.		18	3.02	21.		18	4.47
43.		19	2.92	11.		19	4.39
45.		20	2.71	41.		20	4.33
25.		21	2.46	6.		21	4.31
10.		22	2.45	14.		22	3.52
23.		23	1.86	35.		23	3.09
13.		24	1.24	9.		24	2.44
3.		25	.73	24.		25	2.11

* denotes statements retained for further study and for rating by a panel of judges.

x derived from Edward's formula. (3:153)

TABLE 2

ITEMS FROM THE PILOT STUDY RETAINED FOR FURTHER STUDY AND CONTENT VALIDITY RATING BY A PANEL OF JUDGES

POSITIVE

I like school.
I like most of the teachers.
There is nothing really bad about school.
I like the way my teacher teaches.
I like learning.
Students are usually treated like real people in this school.
I learn important things at school.
Most of the school rules are fair.
I would like my teacher as a neighbour.
I like most of my school subjects.
I like most of the school work.
Students learn well in this school.
Most of the teachers really want to teach us.
I like most of the people at school.
A lot of good things go on in school.

NEGATIVE

Sometimes my teacher is unfair.
Some teachers do not really like students.
Sometimes school reminds me of a jail.
School is boring most of the time.
Most things students learn in this school are not important.
Most of the time school is too much work.
I only like school when there is no homework.
There are times I do not like being with my class.
I will be unhappy as long as I go to school.
The teacher picks on me sometimes.
I hate most of the school rules.
My teacher is nicer to some kids than to others.
I hate most things that happen at school.
All or most subjects except gym and art are boring.
I do not like some of the kids in my class.

TABLE 3

STUDENT SCORES ON THE PILOT STUDY INSTRUMENT REPORTED IN A FREQUENCY DISTRIBUTION

SCORES	f	cf	d	fd	fd^2
240-249	1	125	6	6	36
230-239	2	124	5	10	50
220-229	4	122	4	16	64
210-219	8	118	3	24	72
200-209	11	110	2	22	44
190-199	27	99	1	27	27
180-189	26	72	0	0	0
170-179	23	46	-1	-23	23
160-169	6	23	-2	-12	24
150-159	8	17	-3	-24	72
140-149	3	9	-4	-12	48
130-139	0	6	-5	0	0
120-129	5	6	-6	-30	180
110-119	1	1	-7	- 7	49
	n= 125			- 3	689

n	125	
M	184.18	
M.	195	
Md.	185.85	
R	126	(116 - 241)
σ	23.47	

TABLE 4

STUDENT SCORES ON THE PILOT STUDY INSTRUMENT REPORTED BY THE FREQUENCY OF EACH SCORE

SCORE	f	cf	SCORE	f	cf
116	1	1	187	2	66
121	1	2	188	1	67
124	1	3	189	5	72
125	2	5	190	3	75
129	1	6	191	3	78
146	1	7	192	2	80
148	2	9	193	2	82
152	1	10	194	3	85
153	2	12	195	8	93
156	1	13	196	3	96
158	2	15	197	2	98
159	2	17	198	1	99
161	1	18	200	1	100
162	1	19	201	3	103
164	1	20	202	2	105
166	1	21	204	1	106
167	1	22	205	2	108
169	1	23	206	1	109
170	2	25	207	1	110
171	3	28	210	1	111
172	4	32	211	1	112
173	4	36	214	3	115
176	3	39	216	1	116
177	2	41	218	1	117
178	4	45	219	1	118
179	1	46	220	1	119
180	1	47	222	1	120
181	3	50	226	1	121
182	2	52	227	1	122
183	2	54	232	1	123
184	6	60	236	1	124
186	4	64	241	1	125

TABLE 5

STUDENT SCORES ON THE PILOT STUDY INSTRUMENT REPORTED BY INDIVIDUAL CLASS GROUPS

STUDENT NO.	GROUP 1	GROUP 2	GROUP 3	GROUP 4	GROUP 5	GROUP 6
1.	190	201	189	153	226	195
2.	184	196	214	176	121	181
3.	198	178	202	158	159	232
4.	189	241	184	177	173	220
5.	173	159	196	172	171	194
6.	181	218	171	152	201	180
7.	172	186	190	173	195	184
8.	195	192	184	125	169	205
9.	179	178	148	153	176	227
10.	116	-	177	161	178	187
11.	182	192	195	162	146	184
12.	191	193	191	129	197	195
13.	191	181	125	189	205	201
14.	186	176	166	172	172	189
15.	211	204	158	182	195	214
16.	171	186	183	170	214	190
17.	193	173	195	216	207	206
18.	196	186	202	164	124	222
19.	184	210	219		170	167
20.	197	194	236		200	
21.	187	188			178	
22.	195	183			194	
23.		189				
24.		156				
25.		148				

							TOTALS
n	22	24	20	18	22	19	12 5
M	184.6	187.8	186.3	165.78	180.5	198.58	184.18
Mo	184,191,195	186	184,195,202	153,172	178,195	184,195	195
Md	188	188	189.5	167	178	195	185.85
R	96	94	112	92	106	66	126
σ	17.65	19.67	24.99	20.62	26.77	17.79	23.47

TABLE 6

THE MEANS, FOR EACH PILOT STUDY STATEMENT, OF THE TOP TWENTY-FIVE PERCENT AND THE BOTTOM TWENTY-FIVE PERCENT OF STUDENTS' OVERALL SCORES.

ITEM NO.	HI GROUP	LO GROUP	DIFFERENCE	ITEM NO.	HI GROUP	LO GROUP	DIFFERENCE
1.	4.75	3.86	.89	26.	3.77	1.72	2.05
2.	2.97	1.69	1.28	27.	4.38	3.53	.85
3.	4.09	3.86	.23	28.	4.78	3.97	.81
4.	4.03	2.63	1.40	29.	4.44	3.09	1.35
5.	4.19	3.22	.97	30.	4.84	3.78	1.06
6.	4.38	3.06	1.32	31.	3.69	2.38	1.31
7.	4.63	3.09	1.54	32.	4.19	2.77	1.42
8.	4.72	3.34	1.38	33.	4.31	3.34	.97
9.	2.44	1.72	.72	34.	3.25	1.72	1.53
10.	5.00	4.84	.16	35.	3.91	2.84	1.07
11.	3.69	2.38	1.31	36.	4.75	3.31	1.44
12.	4.56	3.13	1.43	37.	4.63	3.28	1.35
13.	4.63	4.44	.19	38.	3.63	2.06	1.57
14.	3.06	2.09	.97	39.	4.43	3.31	1.12
15.	3.78	2.09	1.69	40.	3.94	2.59	1.35
16.	4.69	3.94	.75	41.	4.78	3.78	1.00
17.	4.53	3.31	1.22	42.	4.91	3.81	1.10
18.	4.59	3.53	1.06	43.	4.91	4.34	.57
19.	4.31	3.22	1.09	44.	4.84	3.84	1.
20.	4.09	3.22	.87	45.	4.78	4.31	.47
21.	3.44	2.13	1.31	46.	4.00	2.09	1.91
22.	4.53	2.44	2.09	47.	4.75	3.63	1.12
23.	2.22	1.75	.47	48.	4.75	3.50	1.25
24.	3.50	2.77	.73	49.	3.78	2.38	1.40
25.	4.78	4.31	.47	50.	4.53	3.53	1.00

TABLE 7

THE CONTENT VALIDITY RATINGS OF THE PANEL OF JUDGES FOR EACH ITEM RETAINED FOR FURTHER STUDY

ITEM NO.	JUDGES 1	2	3	4	5	TOTAL	AVG.	ITEM NO.	JUDGES 1	2	3	4	5	TOTAL	AVG.
1.	4	3	3	4	4	18	3.6	1.	2	2	3	4	4	15	3.
2.	1	3	3	3	4	14	2.8	2.	4	3	3	4	4	18	3.6
3.	3	3	4	4	4	18	3.6	3.	1	4	4	3	1	13	2.6
4.	4	3	3	3	3	16	3.2	4.	2	2	4	3	4	15	3.
5.	2	-	4	2	4	12	3.	5.	3	4	3	3	1	14	2.8
6.	2	3	3	3	4	15	3.	6.	3	3	4	4	4	18	3.6
7.	2	2	2	4	4	14	2.8	7.	2	3	4	4	3	16	3.2
8.	3	3	3	3	4	16	3.2	8.	4	3	4	3	4	18	3.6
9.	4	4	4	4	4	20	4	9.	2	3	4	3	4	16	3.2
10.	4	4	4	2	2	16	3.2	10.	3	3	4	2	4	16	3.2
11.	2	3	3	3	2	13	2.6	11.	3	4	4	4	3	18	3.6
12.	2	3	3	3	3	14	2.8	12.	2	3	4	4	3	16	3.2
13.	1	3	3	3	4	14	2.8	13.	3	4	2	4	4	17	3.4
14.	2	4	3	3	4	16	3.2	14.	3	2	-	3	4	12	3.
15.	4	3	4	3	4	16	3.2	15.	2	4	4	3	3	16	3.2

TABLE 8

STATISTICAL ANALYSIS OF PRE-TEST SCORES

EXPERIMENTAL GROUP		CONTROL GROUP	
STUDENT NO.	SCORE	STUDENT NO.	SCORE
1.	79	1.	110
2.	72	2.	100
3.	88	3.	57
4.	65	4.	89
5.	76	5.	81
6.	58	6.	68
7.	82	7.	97
8.	57	8.	93
9.	117	9.	105
10.	100	10.	37
11.	92	11.	86
12.	73	12.	74
13.	69	13.	66
14.	70	14.	77
15.	98	15.	64
16.	103	16.	92
17.	104	17.	91
18.	89	18.	70
19.	63	19.	102
20.	101	20.	68
21.	102	21.	79
22.	86	22.	104
23.	75	23.	103
24.	95	24.	59
		25.	76
M	83.92	M	81.92
Mo	all scores	Mo	all scores
Md	84	Md	86
σ	16.91	σ	18.34
R	61	R	73

TABLE 9

STATISTICAL ANALYSIS OF POST-TEST SCORES

EXPERIMENTAL GROUP		CONTROL GROUP	
STUDENT NO.	SCORE	STUDENT NO.	SCORE
1.	81	1.	78
2.	75	2.	92
3.	61	3.	-
4.	-	4.	65
5.	99	5.	71
6.	67	6.	66
7.	84	7.	94
8.	48	8.	79
9.	118	9.	87
10.	-	10.	47
11.	99	11.	97
12.	94	12.	73
13.	83	13.	74
14.	90	14.	-
15.	103	15.	72
16.	110	16.	71
17.	102	17.	79
18.	-	18.	68
19.	75	19.	68
20.	100	20.	62
21.	94	21.	73
22.	100	22.	106
23.	86	23.	105
24.	100	24.	45
		25.	66
M	89	M	75.57
Mo	100	Mo	66,68,71,73,79
Md	94	Md	73
σ	16.97	σ	16.36
R	71	R	62

APPENDIX B

- the pilot study instrument

APPENDIX C

- items retained after the rating for content validity by a panel of judges

Pages 49 thru 53 missing 54

ITEMS RETAINED AFTER THE RATING FOR CONTENT VALIDITY BY A PANEL OF JUDGES

POSITIVE

I like school.
I like most of the teachers.
There is nothing really bad about school.
I like the way my teacher teaches.
I like learning.
Students are usually treated like real people in this school.
I learn important things at school.
Most of the school rules are fair.
I would like my teacher as a neighbour.
I like most of my school subjects.
I like most of the school work.
Students learn well in this school.
Most of the teachers really want to teach us.

NEGATIVE

Sometimes my teacher is unfair.
Some teachers do not really like students.
Sometimes school reminds me of a jail.
School is boring most of the time.
Most things students learn in this school are not important.
Most of the time school is too much work.
I only like school when there is no homework.
There are times I do not like being with my class.
I will be unhappy as long as I go to school.
The teacher picks on me sometimes.
I hate most of the school rules.
My teacher is nicer to some kids than to others.
I hate most things that happen at school.

APPENDIX D

- program of staff training

PROGRAM OF STAFF TRAINING

1. READINGS

a) "Teaching in the Outdoors" by D. Hammerman and W. Hammerman
   - Chapters 1, 2, 3, 4

b) "Outdoor Education: A book of readings" by Hammerman and Hammerman
   - What is Outdoor Education (p. 2-6), L.B. Sharpe
   - The Scope of Outdoor Education (p. 25-28), J. Smith
   - A Case for Outdoor Education (p. 45-48), D. Hammerman
   - Schoolgrounds for Teaching Man's Relationship to Nature (p. 135-41), J. Brainerd

2. DISCUSSION

a) Two meetings of at least two hours each between the researcher and the class teacher. The purpose was to relate the readings to the specific approach used in this investigation.

b) A weekly meeting of at least one half hour between the researcher and the class teacher. The purpose was to review problems from the past week's activity and preview the activity for the coming week.

APPENDIX E

- the weekly treatments administered to students of the experimental group.

WEEK: 1

ACTIVITY: Cross Country Skiing

OBJECTIVE: Physical Education-Recreation in the Winter Environment

1. PRE-TEACHING:

a) Clothing

- A hat. Most heat is lost through the head.
- Layers of clothing on the upper body. Start with soft cotton, progress to a number of sweaters covered by a wind-proof, waterproof outer garment. For maximum warmth one of the garments should be a turtleneck.
- Handwear. Mits are better than gloves, since the fingers can keep each other warm. The outer layer should be wind and waterproof.
- Legs. Long underwear useful in cold weather.
- Feet. A thin wool sock, with a heavier wool sock over it. The toes must not be cramped.
- Optional: a hood on the jacket, gaiters, glasses (more mountain conditions).

b) Benefits of Wool

- It traps air, thus providing a shell to keep the warmth in.
- It insulates when wet.
- It "breathes", allowing body moisture to escape.
- It sheds snow, so will not get soaked.

c) Organizing a Trip

- Make sure you know the route.
- Leave the following information with the principal: your route, the time of departure and arrival.
- Check the weather - it will tell you if the trip is feasible and give an indication of what clothes to wear.
- Organize the class into groups of four. Someone in the group will bring a small pack. Each person should bring an extra sweater and pair of mitts.

d) Crucial Safety Procedures

- The group of 4 stays together in single file. One person is designated as a leader of the large group and one is trail. NO ONE goes beyond these persons.
- Each student should be assigned a buddy. He will check for signs of frostbite.

2. THE EXCURSION:

a) - Have each group check their equipment and clothing before starting.

b) - The tour should last 1 - 1 1/2 hours. The group should stay together. At least two stops should be made at comfortable or interesting spots.
- At each spot the groups count heads.
- Be sure that buddies are conducting periodic checks on one another.

3. THE FOLLOW-UP:

a) Each student should write a one page (absolute maximum) resumé of interesting things they saw and, in particular, how comfortable they were.

WEEK: 2

ACTIVITY: Cross Country skiing/snowshoeing

OBJECTIVE: Social Studies - winter's effect on travel before the invention of mechanized vehicles

1. PRE-TEACHING:

a) How winter presently affects our ability to transport ourselves or objects.

- Road travel: suffers little. We plough the roads and use snow tires and salt.
- Air and rail: Little if any problem.
- Individual travel: we are somewhat restricted in where we can go, but sidewalks are cleared for us.
- The snowmobile: has changed the situation dramatically. We can now travel virtually anywhere in winter.

b) Winter's affect on travel before mechanized vehicles.

- No public transport, no air and rail, few roads (fewer cleared), few sidewalks.
- Use of the horse: restricted to cleared or packed roads.
- Use of the dog: a standby. It went where the snowmobile goes today.
- Individual transport: in many cases skiis and snowshoes were the person's only means of travel.

2. THE EXCURSION:

a) The students are divided into groups of four. Each group has two sets of skiis and two sets of snowshoes. Before leaving, the group should check clothing and equipment. As well, an itinerary should be left with the principal.

b) A 1 1/2 hour tour with the groups experiencing the following:

- Travel in the deep snow of an open field.
- Travel in a wooded area.
- Travel on a packed trail or path.
  - This latter travel could be done on the way to and from the other areas.

3. FOLLOW-UP:

a) Having experienced the advantages and disadvantages of both skiis and snowshoes, the students take the case of a fur trapper and explain (in 1/2 to 1 page) which means of transport would be better for him.

WEEK: 3

ACTIVITY: Survival in a Winter Environment

OBJECTIVE: Social studies - how to survive in the winter environment

1. PRE-TEACHING:

a) Review proper clothing.

b) Preparation for a longer tour.

- Why bother: safety precautions are essential. We cannot "pick" our disasters. Tragedy is most likely to strike those not prepared.
- Food: easy to carry, quick energy foods. (chocolate, candy, liquids with honey).
- Clothing: extra mitts and socks.
- Shelter: plastic tarps to provide for the entire group, rope.
- Equipment: compass, matches in a waterproof container, under-pad (longer touring).

c) Procedures to follow in an emergency.

- Use a buddy system. Count heads.
- Stay put. If well prepared you can survive and people will come after you.
- Get under shelter: the wind greatly increases heat loss, as does wet clothing.

d) Review of trip preparation

- Leave itinerary, departure and arrival times.
- Know the route. (relate this to "Lost in Algonquin").

2. THE EXCURSION:

a) Organize the students into self-contained groups of 6-8. Each group should carry food, equipment, shelter etc... in backpacks (small nylon are ideal).

2. b) Ski to a spot where shelters can be put up.

   - The ideal location would be sheltered, with small dead branches available for firewood.
   - The shelters can be put up using dead branches for support, or tied between trees. Do not make them too high. The side into the wind should be buried in the snow.

   c) The group is now in an excellent position to cook a lunch or warm soup on a stove or an open fire.

3. FOLLOW-UP:

   a) A number of exercises would be ideal. The students are now in a position to read about someone else's experience and assess it. As resource you might use:

   - "Lost in Algonquin Park". Readers Digest, November, 1977,
     - probably the easiest. Also easy to pick apart and see near tragedy.
   - "To Build a Fire" by Jack London.

WEEK: 4

ACTIVITY: An experiment to test the effect of ski wax

OBJECTIVE: Science - how to structure a simple experiment

1. PRE-TEACHING:

a) Discussion on what an experiment is

- It is a method of solving a problem or answering a question. In it we run a test to gather evidence from which we hope to make a conclusion.
- If the results are not conclusive we can: i) run the test again, checking on our procedures ii) improve the procedures.

b) Develop a format for the experiment.

- Problem: what question are we trying to answer.
- Procedure: what do we do to find out.
  - it is important for a scientist to record procedures exactly.
- Results: what happened.
- Conclusion: did we get an answer.

c) Identify a specific problem

- Does ski wax grip the snow

d) Structure the experiment

- The students are divided into groups of 5. At least one person in the group will use step-base skiis.

2. THE EXCURSION:

a) Take the group to a short hill

- The students with step-base skiis record, while the other group members attempt to walk up the hill. The group is evenly divided into those with no wax and those with an appropriate wax on their skiis.

3. FOLLOW-UP:

a) Chart the results of the groups.

b) Compare the results and draw conclusions.

c) Discuss the idea of controlling the variables in an experiment.

d) Design an experiment to see if wax helps skiis to glide also.

WEEK: 5

ACTIVITY: Study galls on plants

OBJECTIVE: Science - study the life cycle of an insect

1. PRE-TEACHING:

   a) Determine what a gall is

      - The reaction of a plant to the presence of an insect.
      - Inside the gall, the larval stage of the insect lives for a period of time. At some point it will emerge as an adult.

   b) Specify the goldenrod gall and trace its development
      - Find library books for the students to study.

   c) Review knowledge of the goldenrod plant.

      - Where did we find it in the autumn?
      - The gall will be found on the stem. At this time of year it will be just above the snow, looking like a brown ball on a stick.
      - If the gall already has a hole in it this is due to a bird that has eaten the larva.

2. THE EXCURSION:

   a) Prepare for the outing: clothing, ski waxing, information on departure and arrival, survival preparation.

   b) Take an outing of 40 minutes to one hour to find and collect 6-8 galls.

3. FOLLOW-UP:

   a) Working in groups, cut open the galls. Try not to destroy the larva.

   b) Preserve the larva and the galls.

   c) Construct a chart showing the life cycle of the insect.
      ie: egg, pupa, larva to adult.

WEEK: 6

ACTIVITY: Study a community in winter

OBJECTIVE: Social studies - study adaptations we make because of climate

1. PRE-TEACHING:

   a) Discover the meaning of "adaptation" from a dictionary.
      ie: adjusting to a new environment, being flexible, changing to meet new conditions.
   b) Discuss what adaptations we are likely to find in a community during winter.
      ie:-individuals: we wear clothes that suit cold (down jacket), wet (overshoes) or any other condition.
      -mechanical: we put anti-freeze in cars, use snow tires, develop special machines (ski-doo), adapt other machines (snowthrower).
      -shelter: we insulate our homes, put on storm windows, use aluminum doors, install furnaces in our homes, use portable shelters for our cars.
      -recreational: we use the outdoors as a resource (X-C skiing).
      -transport: we clear streets (an entire industry), spread salt and sand, shut down shipping.

2. THE EXCURSION:

   a) Organize the students into groups of four. Each group should have a recorder. The recorder has a clipboard, a pencil and a listing of the adaptations that were discussed.
   b) Using the nearest residential block, try to confirm the existence of these adaptations.

3. FOLLOW-UP:

   a) List the discoveries under the headings originally discussed.
   b) Discuss the impact of each adaptation. Do animals make this adaptation?

ie:	adaptation	salt on the streets
	impact	it allows us to travel safely, BUT it erodes cars
	animals	cannot make this kind of artifical adjustment. (deer in deep snow).
OR	adaptation	wearing heavy clothes
	impact	it costs us money, but also supports entire industries.
	animals	can grow thicker fur

WEEK: 7

ACTIVITY: Filter snow found in different locations

OBJECTIVE: Science - discover evidence of pollution

1. PRE-TEACHING:

   a) Describe the activity: to collect snow from different locations, melt it, run the water through a filter, observe evidence of pollution.

   b) Identify the locations: i) close to the road, ii) beside a ski trail, iii) the cleanest looking snow they can find.

   c) Speculate as to the degree of pollution in each sample and what the pollutants might be.

   d) Structure the experiment to be as valid as possible.
      - Clean collecting containers(sealed), clean filter paper (try various materials), clean container to melt the snow.
      - An instrument to observe the pollutants(magnifier or microscope).

2. THE EXCURSION:

   a) Divide the class into groups of four. Each group has clear plastic vials to use as collectors.

   b) Take a ski tour to collect two samples from each location.

3. FOLLOW-UP:

   a) Melt the snow. Run the water through filter paper.

   b) Observe the pollutants under a magnifier and attempt to identify them.

   c) Make microscope slides of pollutants discovered in the "clean" snow.

   d) Using the filter paper on cardboard, make displays of the pollutants.

WEEK: 8

ACTIVITY: Study snow and air temperatures

OBJECTIVE: Science - collect and chart data

1. PRE-STUDY:

   a) Review the procedures to be used: compare temperature readings from various locations.

      - out of the snow
        - -in the sun
        - -in the shade
      - in the snow
        - -a shady spot 10 cm. deep
        - -a shady spot 20 cm. deep
        - -a sunny spot 10 cm. deep
        - -a sunny spot 20 cm. deep

   b) Speculate as to where the coldest temperature will be found - the warmest also.

   c) Establish groups of four students each. The groups need a thermometer and a recorder with a clipboard.

   d) Design a form that will be used to collect the necessary data.

2. THE EXCURSION:

   a) While on a ski tour stop to record temperatures in the appropriate locations.

3. FOLLOW-UP:

   a) Construct a master chart showing the temperatures from each location.
   b) Average the temperatures for each location.
   c) Rank the locations by temperature.
   d) Attempt to explain the differences in temperature.
      - the effect of the sun and wind
      - snow, being 82% air, acts as an insulator. The temperature in it will be more constant than air temperature.
   e) Chart snow and air temperatures over several days. Which is more constant?

WEEK: 9

ACTIVITY: Test the insulating ability of snow using mini-igloos

OBJECTIVE: Social studies - investigate the use of snow as a shelter

1. PRE-TEACHING:

   a) Review the findings of the last excursion -- temperature in the snow is more constant than air temperature.
   b) Watch the Tuktu film on constructing an igloo. Discuss how the igloo functions. Discuss the term "insulation".
   c) Describe the activity to be done: build a mini-igloo (1 m.). Using a hot water bottle, introduce heat. Record temperatures over a period of time (pre-heat, 2 mins., 4 mins., 10 mins.)
   d) Speculate as to what might result from this experiment.

2. THE EXCURSION:

   a) Divide the students into groups of four. Each group should have: instruments to pile snow, an instrument to hollow out the mound, a thermometer, a sheet to record data.
   b) Pile snow into a mound. Hollow out a cavity in the mound.
   c) Introduce heat into the cavity. One possibility is to use a hot water bottle on a shovel.
   d) Record the temperature inside the cavity before introducing the heat and at timed intervals thereafter.
      ie: 2, 4, 10 mins.

3. FOLLOW-UP:

   a) Compare the results from group to group. Average the results. Could snow be used as a shelter?
   b) Design experiments to demonstrate the insulating ability of snow.
      ie: - using two coke bottles full of water, one buried in the snow the other left above the snow.

WEEK: 10

ACTIVITY: Study the melting rate of snow

OBJECTIVE: Science - observe how different materials and colours will absorb and retain heat

1. PRE-TEACHING:

   a) Determine what factors cause snow to melt (sun, temperatures above 0^{o}).
   b) Observe where the snow melts first (road, sidewalk, roof)
   c) What factors are present: amount of sun received, depth of snow.
      - is the sub-surface a factor?
   d) Speculate as to how we can affect the melting rate in an area of constant sun.

2. THE EXCURSION:

   a) Find a spot that gives room to work, and constant sun.
   b) Make a number of snowballs that are the same shape and size.
   c) Set up stations that have one snowball on a particular type of surface. The surfaces should include:
      i) material - wood, metal, paper, plastic
      ii) colour - black, white, reflective, blue
   d) Observe and time the rate of melting

3. FOLLOW-UP:

   a) Rank the surfaces according to the rate of melting.
   b) Organize a contest to see which group of students can determine where the last patch of snow in the school yard will be.
   c) Apply the knowledge gained to other situations. ie: what colour would you wear in a tropical country, what colour or material would you use to collect solar energy.

WEEK: 11

ACTIVITY: Observing Signs of Spring

OBJECTIVE: Science - Discover Evidence of Seasonal Change

1. PRE-TEACHING

a. Why spring occurs

- Longer and stronger sun due to the earth's rotation on its axis.

b. Ways in which the coming of spring can be observed

- The melting of snow
- The softening of the ground
- The emergence of buds
- The return to green of plants

2. THE EXCURSION

- Divide the students into groups of four. Assign 1-2 groups to each of the following experiments on the school site.

a. Test, by pushing in a pencil, the hardness of the ground in a spot where the snow has been gone for some time, in a spot where it has just melted and in a spot where you have cleared the snow.

b. Mark, with a stake, the edge of a patch of melting snow. For a period of three days mark the recession of this patch.

c. Find the spot, on the school site, where the snow is deepest.

3. FOLLOW-UP

a. Discuss and chart the results.

b. Initiate a contest (groups of four) in the class to determine who can predict where the last patch of snow on the school site will be.

WEEK: 12

ACTIVITY: Compare a City Block With a Wooded Area

OBJECTIVE: Environmental Science

1. PRE-TEACHING

a. Review the concept of adaptation - changing something to your needs.

b. List the adaptations (to the natural environment) man has made to create a community.

- Clear shrub and woods - eliminate animal homes.
- Level rough ground.
- Pave areas for roads and sidewalks.
- Attempt to beautify by re-planting trees, flowers, shrubs and lots of grass.

2. THE EXCURSION

a. Take the class to a nearby wood and gather the following data:

- Stake out a 5 m. by 5 m. area and determine how many types of trees and shrubs are present.
- Where could creatures live in this 5 x 5 "environment", ie: under rocks, in the soil, in trees, in rotten wood.
- Is there any grass here.

b. Take the class to the nearest residential block and answer the questions from activity 2a.

- Is the vegetation here the same as in the wood? Has man chosen it to suit his own purposes, ie: beauty?
- What objects from the woods does man use in his community. List them.

3. FOLLOW-UP

a. Construct a chart that compares the data. Discuss the impact man's coming had on the 5 x 5 patch of woods. ie: small creatures, trees, plants.

b. Have the students write a cartoon strip that describes the experiences of an earthworm or other creature during this transformation.

WEEK: 13

ACTIVITY: Investigate a Mini-Habitat

OBJECTIVE: Science - Collect and Report Data

1. PRE-TEACHING

   a. Discuss the concept that environments exist within environments. ie: a one square foot area has its own eco-systems, yet exists within a larger eco-system.

   b. Discuss what might be found within a hula hoop sized area of the school yard or nearby field. ie: plants, grass, soil, creatures, rocks.

   c. Design a form that can be used to collect data about the mini-environment. (or use the one provided)

   d. Divide the students into groups of four. Each group should have a recorder with pencil and paper (the form for data) as well as two small collecting bags and a hula hoop.

2. THE EXCURSION

   a. The groups are dispersed equally between the school yard and a nearby field. They are given 15 minutes to collect data and objects.

3. FOLLOW-UP

   a. Have one person from each group report to the class on the most interesting aspects of their environment. (2 minutes).

   b. Discuss ways the data might have been reported more clearly.

WEEK: 13

GROUP MEMBERS: _____

_____

DATE: _____

LOCATION OF MINI-ENVIRONMENT: _____

TYPES OF PLANTS	
TYPES OF ROCKS	
EVIDENCE OF ANIMAL LIFE	
DESCRIPTION OF THE SOIL	
OTHER OBJECTS	
MOST INTERESTING THING	

WEEK: 14

ACTIVITY: The Study of a Fallen Log

OBJECTIVE: Environmental Science - Introduce the Concept of Interdependance in Nature

1. PRE-TEACHING

a. Discuss the concept of interdependance, that beings in nature exist as part of a complicated web. ie: the strong depend on the weaker for food. This can be traced back to vegetation (feeds the lower forms of life) as the basis of our existence.

b. Introduce a fallen tree (or stump) as an example of this interdependance.

- The tree goes through a cycle from seed, to tree that bears fruit etc..., to fallen log that rots and fertilizes the soil. This fertilization helps new trees grow and the cycle continues.
- As a fallen log the tree serves as an animal home for the insects that, in turn help to break it up. Moss helps by keeping it wet.
- Larger hollow logs may serve as homes for bigger animals.

c. Introduce a sheet of questions that will guide the students investigation.

N.B. The size of the groups will depend on the number of logs available.

2. THE EXCURSION

a. Divide the students into groups, each having a recorder with paper and pencil.

Equipment small magnifier, small knife, collecting sacks (3-4).

b. Proceed to the wooded area and give the students 30 minutes to study the log. Carefully collect a sample of the log and the plant life.

3. FOLLOW-UP

a. Discuss which of your pre-teaching was confirmed. Dwell especially on creatures using the log as a home.

b. Using paper towels, display the plant life for the students to observe with the magnifiers.

c. Leave pieces of the log on the window ledge. What happens to it? Compare it to pieces of lumber.

WEEK: 15

ACTIVITY: Study Common Coniferous Trees

OBJECTIVE: Language Arts - The Use of Notes

1. PRE-TEACHING

a. Discuss the classification of trees

i) coniferous - trees that retain their foliage all year (except tamarack) also called evergreen, needle-leafed or softwoods.

ii) deciduous - trees that lose their foliage each autumn. also called broadleaf or hardwoods.

b. Use the Zim books to discuss the characteristic foliage of four common conifers:

i) Eastern white cedar

- The leaves are scale-like, broader than those of other evergreens and not prickly.
  The leaves are aromatic when crushed.

ii) Balsam fir

- The leaves are flat and the branches feel soft. They do not grow all around the twig. There are two light stripes on the bottom of each needle.

iii) Pine

- The needles grow in clusters of 2, 3 or 5.
  The needles are longer than those of other evergreens.

iv) Spruce

- The needles are sharp, four sided (round) and grow all around the twig.

WEEK: 15 (cont'd)

2. THE EXCURSION (to be conducted inside)

   a. The students should be divided into groups of four. Each group has a bag containing samples of foliage, writing materials and a Zim tree book.

   b. The students examine the samples, record notes on each, and attempt an identification.

   c. Group results are checked by another group.

3. THE FOLLOW-UP

   a. Take a neighbourhood excursion to find which of these trees are used for landscaping purposes.

   b. Do some research to discover what Canadians use these trees for.

spruce	One of our most important trees for lumber and pulpwood.
balsam	Another important pulp producer. Also marketed as "spruce".
cedar	Resistant to rot and used in poles, posts, canoes, shingles.
pine	The most valued softwood lumber in Eastern Canada. Uniform in texture, used for window sashes and frames, doors, mouldings, trim, siding, panelling and cabinet work.

RESOURCE BOOKS

1. TREES, A Golden Nature Guide, Herbert Zim.
   Golden Press, N.Y.
2. NATIVE TREES OF CANADA, Canadian Forestry Service

WEEK: 16

ACTIVITY: Use Creatures found in Swamp Water to make Microscope Slides

OBJECTIVE: Science - Learn how to use a Microscope

1. PRE-TEACHING

   a. Discuss the purpose of a microscope and its workings. Briefly describe how a slide is made.

   b. Discuss the life-cycle of a mosquito to illustrate how water can serve as a habitat for different life forms.

   c. Organize the students into groups of six. Each group requires the following equipment:

      - a microscope
      - eight blank slides, cover plate and marking sticker
      - a container in which to collect swamp water
      - an eye dropper

   d. Review the procedures to be used during the excursion.

2. THE EXCURSION

   a. Move the class to an area where swamp water can be collected.
   b. Have each group collect a sample of water in which there are living organisms.

3. FOLLOW-UP

   a. Using the Zim books (insects) attempt to identify some of the specimens.
   b. Have each student construct and label a permanent slide of a specimen.

Note to Teachers

- In areas where swamps are not accessible the same activity can be used with grass cuttings placed in a jar. Add water to the jar and observe the contents for signs of life. Microscopes may be used to examine the organisms that appear.

WEEK: 17

ACTIVITY: Determine Time Without a Watch and Direction Without a Compass

OBJECTIVE: Social Studies - Play the Role of an Early Pioneer

1. PRE-TEACHING

   a. The day before this experience instruct students not to wear watches the following day.

   b. Divide the class into two groups, with students paired off in each group.

      i) Instruct one group on the method of putting a stake in the ground and locating the end of the shadow to determine an east-west line.

      ii) Instruct the second group on the method of telling time using a magnetic compass.

2. THE EXCURSION

   a. Proceed to the school yard. Have each group undertake their task, in pairs. Record their results.

      equipment - 12 to 15 compasses
      - 15 stakes
      - 1 pencil per student and writing paper

3. THE FOLLOW-UP

   a. Check the results using a watch and a compass.

   b. Students find a new partner, from another group, and instruct them. Repeat the tasks.

WEEK: 17 (cont'd)

BACKGROUND INFORMATION

- Determining Direction Using Shadows

  1. Place a stake in the ground. Put a pencil in the ground to mark the end of the shadow that is cast.

  2. Allow 15 minutes to pass. Put a pencil in the ground to again mark the end of the shadow cast by the stake.

  3. The line between the pencils is in an east-west direction.

- Telling Time Without a Watch

  1. Hold the compass in front of you at waist level in a palm-up position, having set the dial at a bearing of N (0^{o}). *
  2. Turn until the magnetic needle and orienting arrow are aligned. You will now be facing south.
  3. Locate the sun and determine where it is in relation to the compass dial.
  4. If the sun appears over the S of the compass dial the time is 12 noon. Assuming that the E setting is 6:00 a.m. and the W setting would be 6:00 p.m., approximate the time.

     ie: If the sun appears to line up halfway between E and S, the time is 9:00 a.m.
     If the sun is halfway between S and W, the time is 3:00 p.m.

     *In this case the direction of travel arrow must be pointed at you.

WEEK: 18

ACTIVITY: Study the Function of Tree Buds

OBJECTIVE: Science - Investigate One Aspect of a Tree's Growth

1. PRE-TEACHING

   a. Discuss the vocabulary to be used. (make use of the diagrams provided)

      - branch
      - branchlet
      - twig
      - previous year's twig
      - bud - terminal
        - side (lateral)

   b. Using the diagram as a guide, discuss the function of the bud.

      - leaves develop from the bud - growth
      - the branchlet grows out through the terminal bud, forming the year's growth
      - the bud is sealed in winter (scales) protecting the tree

   c. Discuss the idea of "discriminate collecting".
      ie: taking only what we need (as scientists) without harming the tree.

   d. Outline procedures for the excursion.

2. THE EXCURSION

   a. The students are divided into pairs. Each pair collects, from a wooded area, one sample of a twig from a deciduous tree.

      N.B. small pliers, or a sharp knife are excellent for the pruning.

   b. The teacher collects **six** additional samples.

WEEK: 18 (cont'd)

3. FOLLOW-UP

a. On the cardboard provided the pairs of students mount their twig and identify the parts.

b. The samples collected by the teacher are put in water to develop. At least one sample should be left in the cupboard, away from light.

WEEK: 19

ACTIVITY: Study Common Deciduous Trees

OBJECTIVE: Language Arts - Reinforce and Apply Notetaking Skills

1. PRE-TEACHING

   a. Review the basic classification of trees (activity 15).

   b. Discuss the basic vocabulary of leaf arrangement:

      - alternate, opposite, whorled
      - simple, compound, doubly compound

   c. Discuss the basic vocabulary of leaf edges:
      - smooth, toothed, lobed

   d. Use the twigs gathered in activity 18 to illustrate leaf arrangement.

   e. Using the Zim books, discuss the characteristics of four common deciduous trees:

      - maple (p. 119) (p. 116-7)
      - white birch (p. 70-4)
      - oak (p. 82-6) (p. 98-9)
      - poplar (p. 78)
        (trembling aspen)

   f. Describe procedures for the excursion

2. THE EXCURSION

   a. Take the class to a wooded area where the trees are small enough to be studied.

   b. Working in pairs the students select a tree and describe, in note form, the bark (colour and texture), the leaf arrangement, and the leaf edge (if sufficiently developed).
   If possible, collect a sample leaf.

WEEK: 19 (cont'd)

3. FOLLOW-UP

a. In the classroom, students review the Zim books to determine if their tree is maple, birch, oak or poplar.

b. Have students determine if any of these four trees are on their block.

WEEK: 20

ACTIVITY: Study Spring Wildflowers

OBJECTIVE: Environmental Science - Investigate the concept that living things require specific habitats

1. PRE-TEACHING

a) Discuss the Nature of "habitat"

- That place where a living thing exists and can meet its needs.
- What are some of the major variables in the habitats of living things?
  ie: temperature, light, moisture, man's presence.
- Are living things capable of changing their habitats? Can man change his?

b) Use the Zim Golden Nature Guides to study specific spring wildflowers.

- read about: bloodroot, trout lily, red and white trilliums, dandelions, moccasin flower.
- determine the specific habitat for each of these flowers.

c) Design a chart to gather information on wildflower habitats.

2. THE EXCURSION

a) The students will work in pairs. Each pair should have a flower book, the data gathering chart and a pencil.

b) Take the class on a walk, covering three specific areas:

- a wooded area
- a field area
- a city block

c) In each area use the data sheet to record the type of flower encountered and the specific habitat.

WEEK: 20 (cont'd)

3. FOLLOW-UP

a) Back in the classroom compare findings on each of the flowers observed. Were any of the flowers found in all habitats?

b) Discuss man's presence. Does it seem to affect certain types of wildflowers?

RESOURCES

1. FLOWERS, A Golden Nature Guide, Herbert Zim, Golden Press, N.Y.

APPENDIX F

- the final testing instrument, used in pre-test and post-test

Not Included in the Document